

# East Java HD-MC3D Seismic Survey



The East Java High Density Multi-Client 3D (HD-MC3D) survey is a cooperative project between Petroleum Geo-Services (PGS) and Migas. It totals 3,963 km<sup>2</sup> of HD-MC3D data in the East Java Sea.



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### Introduction

Petroleum Geo-Services, in co-operation with Migas, announced the completion of a High Density MC3D in April 2003.

The back-arch basins of East Java Sea are a continuation of the very prolific onshore basins. Exploration in the offshore areas started in the late 1960's, which resulted in several discoveries, mostly in the 1980's. This area, which has only been marginal tested, has been revitalized after several oil and gas discoveries were made in the last couple of years. These include Bukit Tua, Jenggolo and Payang on the Ketapang block, Oyong located south of the Madura Island, and the onshore Banyu Urip.

The HD-MC3D was acquired with Ramform Challenger and Nordic Explorer, towing streamers with only 62.5m separation. The High Density MC3D will increase the seismic resolution of the reservoirs and enable detailed interpretation of the complicated Upper and Lower Kujung carbonates.

### Hydrocarbon Potential

The survey mainly covers a large portion of the North Madura Platform, some of the highly deformed compressional trend east of Madura Island and part of the East Five Trough to the east. Interpretation of the data demonstrates the presence of a deep rift basin in the southwestern part of the survey area where Base Tertiary is at about 6 km depth in the deepest part of the basin. This basin is believed to contain the Ngimbang Fm and represents, as with most of the back-arch basins in Western Indonesia, a potential source rock kitchen.

This phase was followed by a period in Late Oligocene-Early Miocene of tectonic quiescence, resulting in the deposition of a widespread carbonate platform over most of the survey area (Kujung Fm). The central part of the Madura Platform is further characterized by a sequence of extensive carbonates build-ups. The deposition of the Kujung carbonates was followed by an inversion phase in Late Miocene time, resulting in large scale uplift of the Madura Platform. This was again followed by a Pliocene-Pleistocene compressional phase, related to sinistral wrench movements, where the Madura-Rembang Zone was formed.

The main source rock sequences are related to the deep kitchen that has been identified in the southwestern part of the area and to an embayment in the East Five Trough in the east. These source rocks are a mixture of lacustrine deltaic and marginal marine (late syn-rift) origin and have a mixed oil and gas potential (Ngimbang Fm). The discovery of the Bukit Tua and Jenggolo on the northern part of the platform probably indicates that migration from the western extension of this kitchen area has taken place.

This area offers a variety of different play types and reservoir rocks. The main reservoirs in this part of the East Java Sea basin are related to carbonate platform and carbonate build-ups that

belong to the Kujung Fm and comprise the reservoir in the Bukit Tua and Jenggolo oil discoveries. The 2D survey has clearly demonstrated the presence of several large prospects and leads related to the Kujung carbonates as well as in the underlying transgressive sandstones. Eocene sandstones along the flank of the syn-rift grabens belonging to the Ngimbang Fm represent an additional play, as proven in discoveries such as in the Pagerungan Field to the southeast of the survey area.

These rift sands appear to have reasonable reservoir potential since they are not buried too deeply. Ngimbang carbonate build-ups comprise additional reservoirs in several discoveries within this area and could represent a potential reservoir in front of the Paleogene-Early Miocene shelf edge on structural highs (southwest portion of the survey area).

### Survey Area

3,963 sq km

### Acquisition Details

2002/2003 - Ramform Challenger & Nordic Explorer  
2 x 3090 cu in  
12/6 streamers x 3600m

### Acquisition Parameters

Sodera G Guns  
2 ms sample rate  
Record Length 4000 ms  
Shot Interval 12.5m flip-flop  
Line spacing (subsurface) 15.625m (inline) x 12.5m (crossline)  
Nominal fold 72

### Processing Parameters Include

Radon Demultiple, Pre-Stack Time Migration

### Available Datasets

Field data SEG-D  
Prestack migrated gathers (PGS format)  
Raw Migrated Stack SEG-Y  
Final Migrated Stack SEG-Y  
Near and Far Angle Stacks SEG-Y  
Navigation UKOOA  
Velocity in ASCII format



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